Name: id: section: serial:

QUESTION TWO : [18 pts]

- Give ONE statement that defines an array BB consisting of 200 signed word values.
  _____
- Give ONE instruction that divides the value in register BX by 2.
  _____
- Give ONE instruction that inverses ONLY all odd-numbered bits in DX register.
  _____
- Give ONE instruction that swaps the two halves of register ECX.
  _____
- Give ONE instruction that copies the value stored on the top of the stack into the memory location named **delta**. _____.
- Give ONE instruction that causes the IP/EIP contents to be pushed onto the stack.
  _____
- Give ONE instruction that causes the stack pointer register to be incremented by 4 (Add not allowed). _____
- Give ONE instruction that sores in EDX register the signed value stored in CL register.
  _____
- Give ONE instruction that invokes a NEAR procedure offset address its first instruction is stored in BX. _____
- Give ONE instruction that makes the carry flag equal to the bit number 10 in CX register.
  _____
- Consider the following register dump in a system operating in real-address mode and answer questions **a to d** [All values in **Hexadecimal**]

CS=6FA0	DS=7FA0	SS=8FA0	SP=2A00	BP=2CA8	IP=20F8
AX=2A5B	BX=1AF5	CX=64FC	DX=0CDA	SI=35CF	DI=3500

a) The physical address of the next instruction is _____.

b) The logical address of the next instruction is _____.

c) The type of the source operand used in this instruction: ADC AL, U[BX] is _____

d) If the instruction: PUSH CX is executed, the SP will contain _____ H

- ```
  A1   SBYTE    -128, 255
  B1   SWORD    128, -1, -255
  MT   WORD     20 DUP (30, 90)
  C1   equ      "A"
  F1   equ      _____
  ```

  1) The instruction `MOV AX, B1+4` stores the value _____ H in AX register.
  2) The instruction `MOVSX BX, A1` stores the value _____ H in BX register.
  3) The instruction `MOV DL, byte ptr A1+2` stores the value _____ H in DL register.
  4) To calculate the number of bytes used by all above statements, the blank in the last statement must contain _____.
  ```

Name: id: section: serial:

QUESTION THREE: [18 pts]

- **Write No more than 3 instructions** to subtract `M3 = M3 - 2*M4`, where M3 and M4 are predefined signed memory words.

```
mov ax, M4
shl ax, 1
sub M3, ax
```

- Assuming AL and BL contain any unsigned values, **Write NO more than 5 instructions** to compute: `ECX = BL*128 - AL*32`. Using MULTIPLY instructions is NOT allowed.

```
movzx ecx, bl
shl ecx, 7
movzx eax, al
shl eax, 5
sub ecx, eax
```

- **Write NO MORE THAN 4** instructions to subtract M4 = M4 - M3, where M3 and M4 are **quadword** memory locations (8 bytes each) defined as shown below:

```
M3  Qword   70F05060D0801020H
M4  Qword   6020E03090C010E0H
mov eax, dword ptr M3
cdq
```

- Assuming: X and Y are predefined signed bytes, Write the needed instructions to compute: `EBX = (2^8 - X) * (Y % 7)`.

```
mov ebx, 8
sub ebx, dword ptr X
mov eax, Y
mov ecx, 7
div ecx
mov eax, edx
mov ebx, eax
```

```
cbw
mov bx, 4
shl ax, 6
mov ax, x
mov cx, y
shl bx, 3
sub bx, ax
mov ax, y
mov cl, 7
idiv cl
movsx ax, ah
mov cx, bx
imul cx
mov ebx, eax
```

Name: **id:** **section:** **serial:**

QUESTION FOUR: [20 pts]

1) The assembler accepts as input a _____ program and produced as output an _____ program.

a) .obj, .asm b) .asm, .obj c) .asm, .exe d) .obj, .lst e) None

2) The directive "M1 dword 32ABFFH" is equivalent to:

a) M1 WORD 32ABH, 0FFH b) M1 WORD 0ABFFh, 32H

c) M1 WORD 0FFABh, 32H d) M1 WORD 0AB32, 0FFH e) None

3) The instruction that makes EBX point to the element FF[20] in a signed word array named FF is:

a) MOV EBX, FF[40] b) MOV EBX, OFFSET FF[20]

c) LEA EBX, FF[20] d) LEA EBX, FF[40] e) None

4) Give 1 assembly statement to define a constant, called **MONTH**, having a value 24*30.

a) month equ 24*30 b) month byte 24*30 c) month sbyte 24*30
d) month word 24*30 e) None

5) The directive "**TT dword 2 dup(20ACH, 4 dup(3, 9950), 77)**" occupies _____ bytes:

a) 80 b) 40 c) 80H d) 32 e) None

6) If ax = C971H, the execution of instruction "**ROR AX, 8**" stores in AX:

a) 179C b) 17C9 c) 71C9 d) 719C e) None

7) If register ax contains A4CE, then after executing **SAR ax, 4** register ax will contain:

a) 0A4C b) FA4C c) A4CF d) 4CEA e) None

8) The range of signed numbers that can be stored in ONE BYTE is from _____H to _____H.

a) 0 - 255 b) -128 - +128 c) -128 - +127 d) -255 - +255 e) None

9) The value $(11001010)_2$ represents a signed number (____)$_{10}$, and unsigned number (____)$_{10}$.

a) 202, -54 b) -74, 202 c) -202, 54 d) -54, 202 e) None

10) A computer has 24 address lines and 20 data lines. The maximum memory size directly addressable by this computer is _____ bytes.

a) 2^{20} b) 2^{24} c) $2^{24}/1024$ d) $2^{24}-1$ e) None

11) If a computer has 128 Mbytes main memory, the minimum number of address lines needed for this computer is _____.

a) 128 b) 64 c) 32 d) 25 e) None

12) The proc statement that defines a procedure named P9 with 2 parameters: a1 of type word, b1 is a pointer to byte is:

a) P9 proc, a1: word, b1: byte b) P9 proc a1: word, b1: byte
c) P9 proc a1: word, b1: byte d) P9 proc, a1: word, b1: ptr byte
e) None

13) The statement that calls a procedure P9 defined in the previous question with arguments: bx and a predefined byte named KK is:

a) invoke p9, ax, KK b) call p9, ax, KK
c) invoke p9, ax, addr KK d) invoke p9, ax, *KK e) None

14) The address of the next instruction is specified by _____: _____ registers.

a) cs:ip b) cx:ip c) cx:eip d) cs:sp e) None

Name: id: section: serial:

15) The range of unsigned numbers that can be stored in ONE word is from _____H to _____H

a) $0 - 2^{16}$ b) $-2^{16} - (2^{16}-1)$ c) $-2^{16} - 2^{16}$ d) $0 - (2^{16}-1)$ e) None

16) _____H:720h = 12050h.

a) 1193 b) 11930 c) 12770 d) Unknown e) None

17) Assembly program contains 2 types of statements: directives and _____.

a) Instructions b) Segments c) Procedures d) b+c e) None

18) In real mode, if the address of the last byte in a data segment is 4FFCF, then the DS register will contain _____H.

a) 3FFD0 b) 4FFC c) 4FFC0 d) 3FFD e) None

19) The debug command that displays the source instructions starting at offset 6780H and ending at offset 68FFH is:

a) D 6780 68FF b) A 6780 68FF c) U 6780 68FF

d) A 6780H 68FFH e) None

20) The debug command that displays the next 32 bytes starting at offset 3F00 in the code segment.

a) D CS:32 b) D CS:3F00 32 c) D CS:3F00 3FFF

d) D CS:3F00 3F1F e) None

QUESTION#	1	2	3	4	5	6	7	8	9	10
ANSWER										

QUESTION#	11	12	13	14	15	16	17	18	19	20
ANSWER										

ıe: id: section: serial:

STION FIVE: Write assembly instructions equivalent to the following C++ code [8 pts]

```
i, j=0, k=0;
b[50],c[50],a[50]={10, 34, ...};
(i=0; i<50; i++)
if(*(a+i)%2 == 0)
   { *(b+k) = *(a+i); k++;     }
else
   { *(c+j) = *(a+i);  j++;    }
cout << j << " " << k << endL;
```

Name: id: section: serial:

QUESTION SIX: [10 pts]

Write a complete assembly program that: **[USE INTERRUPTS for ALL input / output operations]**

- Reads a string of 80 characters from the keyboard {**string80**}.
- Invokes (Calls) a procedure **P8** with 2 parameters: a given string **string80** and a resulting string named **digits**.
- Displays the resulting string **digits** on the screen.
- Procedure **P8** accepts 2 parameters: **SI** a pointer to a given string and **DI** a pointer to a resulting string. The procedure SHOULD copy all digits from a given string into resulting string.